EXHIBIT 13

Amendment in Response to
November 3, 2008 Office Action
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Applicants: Michael Wayne Graham et al.

United States Court of Appeals,
Federal Circuit.
STRATOFLEX, INC., Appellee,
v.
AEROQUIP CORPORATION, Appellant.
Appeal No. 83-587.

July 25, 1983.

Action was brought for judgment declaring invalid and noninfringed a patent for tubing used in the aircraft and missile industry to convey pressurized fuel, lubricants, and other fluids. The United States District Court for the Eastern District of Michigan, 561 F.Supp. 618, Patricia J. Boyle, J., declared certain claims of the patent invalid and not infringed, and appeal was taken. The Court of Appeals for the Federal Circuit, Markey, Chief Judge, held that the evidence was sufficient to sustain the finding that claims Nos. 1, 3, 4, 6 and 7 of patent No. 3,473,087 for the tubing were invalid for obviousness.

Affirmed.

West Headnotes

[1] Patents 291 ⚿312(1.2)

291 Patents
291XII Infringement
291XII(C) Suits in Equity
291k312 Evidence
291k312(1) Presumptions and Burden of Proof
291k312(1.2) k. Patentability and Validity. Most Cited Cases
(Formerly 291k312(1.8), 291k312(1), 291k312, 291k312(.8))
Party asserting invalidity of a patent not only has procedural burden of proceeding first and establishing a prima facie case, but burden of persuasion on the merits remains with that party until final decision; party supporting validity has no initial burden to prove validity, having been given procedural advantage requiring that he come forward only after a prima facie case of invalidity has been made. 35 U.S.C.A. § 282.

[2] Patents 291 ⚿33

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k31 Evidence of Invention
291k33 k. Admissibility in General. Most Cited Cases
Evidence rising out of "secondary considerations" must always when present be considered en route to a determination of obviousness of a patent, and it is error to exclude that evidence from consideration. 35 U.S.C.A. § 103.

[3] Patents 291 ⚿36(1)

291 Patents
291II Patentability
291II(A) Invention; Obviousness
291k36 Weight and Sufficiency
291k36(1) k. In General. Most Cited Cases
Nexus is required between merits of a claimed invention and the evidence offered if that evidence is to be given substantial weight en route to conclusion on the obviousness issue. 35 U.S.C.A. § 103.

[4] Patents 291 ⚿312(5)

291 Patents
291XII Infringement
291XII(C) Suits in Equity
291k312 Evidence
291k312(3) Weight and Sufficiency
291k312(5) k. Particular Patents. Most Cited Cases
Evidence sustained finding that claims Nos. 1, 3, 4, 6, and 7 of patent No. 3,473,087 for tubing used in the aircraft and missile industry to convey pressurized fuel, lubricants, and other fluids were invalid for obviousness. 35 U.S.C.A. § 103.

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Patents 291 ⚿328(2)

291 Patents
291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents
291k328 Patents Enumerated
291k328(2) k. Original Utility. Most Cited Cases
2,108,759, 2,341,360, 2,632,205, 2,645,249, 2,685,707, 2,752,637, 2,781,288, 2,863,174, 2,945,265, 3,070,132. Cited as prior art.

Patents 291 ⚿328(2)

291 Patents
291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents
291k328 Patents Enumerated
291k328(2) k. Original Utility. Most Cited Cases
3,166,688, 3,658,976. Cited.

Patents 291 ⚿328(2)

291 Patents
291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents
291k328 Patents Enumerated
291k328(2) k. Original Utility. Most Cited Cases
3,473,087. Claims 1, 3, 4, 6, and 7 invalid and not infringed.

***1531** Don K. Harness, and Richard A. Walker, Birmingham, Mich., of counsel for appellant. With them on the brief was Jerry K. Harness, Jackson, Mich.

William A. Marshall, Chicago, Ill., argued for appellee. With him on the brief was Donald J. Brott, Chicago, Ill.

Before MARKEY, Chief Judge, and DAVIS and BALDWIN, Circuit Judges.

MARKEY, Chief Judge.

Appeal from a judgment of the District Court for the Eastern District of Michigan, 561 F.Supp. 618, declaring Claims 1, 3, 4, 6, and 7 of U.S. Patent No. 3,473,087 to Winton Slade ('087 patent) invalid and not infringed. We affirm.

When Stratoflex filed suit seeking a declaration of invalidity and non-infringement of the '087 patent, Aeroquip, as assignee, counterclaimed for infringement of claims 1, 3, 4, 6, and 7. After a non-jury trial, Judge Boyle declared those claims invalid and found them not infringed.[FN1]

FN1. Though Stratoflex filed for a declaratory judgment that the *patent* was invalid, trial, judgment, and the briefs on appeal dealt only with claims 1, 3, 4, 6, and 7. Accordingly, we make no holding respecting validity of claims 2, 5, and 8-19.

II. *Background*

A. *The Technology*

Stratoflex and Aeroquip manufacture electrically conductive polytetrafluoroethylene (PTFE)[FN2] tubing used in the aircraft and missile industry to convey pressurized fuel, lubricants, and other fluids.

FN2. The parties refer to polytetrafluoroethylene also as "Teflon," a registered trademark of the E.I. Dupont de Nemours Company.

PTFE has replaced organic and synthetic rubbers and plastic in fuel hoses because it has a number of superior characteristics. ***1532** Though pure PTFE is dielectric (non-conductive), it can be made with fillers to make it conductive, though the "filled" tubing is more susceptible to leakage when voids form between the PTFE and filler particles.

B. *The Invention*

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The Slade invention relates to a composite PTFE tubing, formed of an inner layer of electrically conductive PTFE having particles such as carbon black uniformly distributed in it and an outer layer of essentially pure non-conductive PTFE. Claims 1 and 7 are representative:

> 1. A tubular extrudate formed of attached concentric tubular extrusions, the inner tubular extrusion comprising associated particles of unsintered tetrafluoroethylene polymer and pulverulent, inert, electrically conductive particles, and the outer tubular extrusion comprising associated particles of unsintered tetrafluoroethylene polymer.
>
> 7. A tube of polytetrafluoroethylene and the like for conducting fluids under pressure and including means for discharge of internal static electricity to the ends of the tube and grounding the same from the tube interior at said ends in order to maintain the polytetrafluoroethylene tubing performance characteristics, said tubing having an integral polytetrafluoroethylene wall structure with an interior liner portion of a substantially annular conformation from end to end and having a uniform dispersion of electrically conductive particles embedded therein, the major portion of said tubing wall completely surrounding said liner portion exteriorly and being relatively non-conductive in character, said surrounding portion together with said liner containing fluid under pressures uniformly within said tubing.

Claims 3, 4, and 6 are similar to claim 1, but specify various percentages of ingredients.

The particles in the inner layer of the claimed tubing dissipate electrostatic charges built up on the inner surface of the tubing, conducting them lengthwise of the tubing to grounded metal fittings at the ends of a hose assembly of which the tubing is part, to prevent arcing or discharging through the tubing wall to the surrounding metal braid. Arcing causes "pin holes" through which fuel can leak. The outer layer is coextruded or bonded around the inner layer to contain any fuel leaking through the inner layer. The composite tubing has excellent conductivity, while retaining the desirable characteristics of PTFE tubing.

C. *Events Leading to the '087 Patent*

Pure PTFE tubing had been used successfully in aircraft engines since at least 1956. In 1959, with the introduction of hydrocarbon jet fuels, leaks were noticed. Aeroquip assigned two staff engineers, Abbey and Upham, to determine the cause. They found the problem to be the arcing of electrostatic charges through the wall of the pure dielectric PTFE tubing to create "pin holes" as described above.

Abbey and Upham found the "pin hole" phenomenon exhibited by all three types of PTFE (White-Titeflex; Pink/Red-Aeroquip; Black-Goodrich) used in aircraft engines. The black tubing appeared superior because the carbon black it contained gave it an intermittent conductivity. The carbon black took the form of discontinuous strings and arcing across the spaces between string ends conveyed charges to the ends of the tubing. Electrical erosion of the strings, however, widened the spaces, destroying conductivity and leading to the "pin hole" phenomenon. Abbey and Upham concluded that susceptibility of PTFE tubing to "pin holing" was proportional to its conductivity, and that carbon black increased the conductivity of PTFE tubing.

In early 1960, having determined the cause of leaking, Aeroquip approached Raybestos-Manhattan (Raybestos), a PTFE hose manufacturer, for a solution. Aeroquip later purchased the hose section of Raybestos, obtaining the Slade patent by mesne assignment.

***1533** Raybestos assigned the project to the inventor, Winton Slade, who prepared several samples of conductive PTFE tubing (powdered lead, copper, chemically etched, and carbon black) and sent them

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for testing to Aeroquip in the summer of 1960. In the Fall, Aeroquip ordered a small production quantity of carbon black tubing. That tubing was not a composite and the carbon black was not uniformly distributed in it.

Slade conceived of the composite tube of the invention as early as August 5, 1960 and reduced it to practice in November of 1961. He filed a patent application on May 22, 1962, with claims directed to the composite tubing and also to various processes for making it.

During prosecution, Slade's assignee Raybestos sought and was denied declaration of an interference with a patent application assigned to Titeflex. The Titeflex application issued as U.S. Patent 3,166,688 ('688 patent). Raybestos then was granted an interference with claims 1 and 2 of the '688 patent. An agreement provided that the loser of the interference would receive a royalty free license. Slade was awarded priority and Titeflex was licensed.

When the examiner imposed a restriction requirement on the Slade application, Slade elected to prosecute the product claims, and filed the process claims in a co-pending application which issued as U.S. Patent No. 3,658,976. Slade's original application issued with its product claims as the '087 patent on October 1, 1969.

D. *Stratoflex Actions*

From 1962 to 1970, Stratoflex purchased PTFE tubing containing carbon black from B.F. Goodrich. When Goodrich ceased production, Stratoflex purchased conductive PTFE tubing made by Titeflex under its license. Stratoflex then began manufacturing and selling its own "124" and "127" composite tubing having an inner layer with conductive carbon black uniformly dispersed throughout, and an outer layer that is essentially nonconductive, though that outer layer includes a small amount of carbon black to color the tubing and to aid extrusion.

On December 8, 1978, Aeroquip charged that Stratoflex's unauthorized manufacture and sale of "124" and "127" tubing infringed its rights under the '087 patent.

E. *Trial and Opinion*

Trial was held on December 15, 16, 18, 19 and 22, 1980. Stratoflex alleged that the '087 patent was invalid as anticipated under 35 U.S.C. § 102, as having been in public use or on sale, 35 U.S.C. § 102(b); for obviousness, 35 U.S.C. § 103; or because the claims were indefinite, 35 U.S.C. § 112. Judge Boyle decided the validity issue on 35 U.S.C. § 103, and the appeal concerns only that Section.

On August 16, 1982, Judge Boyle issued judgment and an accompanying opinion. In that opinion, Judge Boyle indicated: that the presumption of validity is weakened when the challenger introduces pertinent prior art not considered by the examiner; that Aeroquip was therefore not entitled to the presumption's full benefit; that the relevant prior art included rubber hose; that one of ordinary skill in the art had a degree in chemical engineering or its equivalent and substantial experience in the extrusion art; that the prior art taught addition of conductive carbon black to tubing to dissipate electrostatic charges on its inner surface; that composite tubing incorporating various materials in each layer to yield superior products was known; that addition of carbon black to PTFE to induce conductivity was known; that the only differences between the claims and the prior art were use of PTFE in concentric tubes and the "salt and pepper" method of forming the inner tube layer; that secondary considerations were not to be considered because the claimed inventions were clearly obvious and "those matters without invention will not make patentability;" that those matters should be considered only in a close case where they could "tip the balance in favor of patentability;" that it was unnecessary ***1534** to determine whether synergism was a separate require-

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ment for validity "since either standard justifies a conclusion that the combination of these elements simply lacks 'the unique essence of authentic contribution' to the (PTFE) art which is the heart of invention;" that Stratoflex did not infringe claims 1, 3, 4, 6 or 7 because the only non-obvious difference between the claims and the prior art was the "salt and pepper" process for making the tubing layer and Stratoflex did not use that process.

Issues

Whether Judge Boyle erred in: (1) declaring claims 1, 3, 4, 6, and 7 invalid; (2) finding non-infringement.

I. VALIDITY

(A) *Presumption of Validity*

The law, 35 U.S.C. § 282, provides:

> A patent shall be presumed valid. Each claim of a patent (whether in independent, dependent, or multiple dependent form) shall be presumed valid independently of the validity of other claims; dependent or multiple dependent claims shall be presumed valid even though defendant upon an invalid claim. The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity.

[1] *See, also, Solder Removal Co. v. USITC,* 582 F.2d 628, 65 CCPA 120, 199 USPQ 129, 133 (CCPA, 1978). The presumption, like all legal presumptions, is a procedural device, not substantive law. It does require the decisionmaker to employ a decisional approach that starts with acceptance of the patent claims as valid and that looks to the challenger for proof of the contrary. Thus the party asserting invalidity not only has the procedural burden of proceeding first and establishing a prima-facie case, but the burden of persuasion on the merits remains with that party until final decision. The party supporting validity has no initial burden to prove validity, having been given a procedural advantage requiring that he come forward only after a prima-facie case of invalidity has been made. With all the evidence in, the trial court must determine whether the party on which the statute imposes the burden of persuasion has carried that burden.[FN3]

> FN3. If that burden is not carried, the trial court need only so state. It is not necessary to hold "valid" a patent that on another record may be shown to have been invalid. If the burden imposed by § 282 is carried, the patent should be declared invalid.

Introduction of more pertinent prior art than that considered by the examiner does not, therefore, "weaken" or "destroy" the presumption. Nor does such introduction "shift" the basic burden of persuasion. The presumption continues its procedural, burden-assigning role throughout the trial. Such introduction can, of course, facilitate the validity challenger's carrying of that burden. It would require one supporting validity to come forward with countervailing evidence, as would the introduction of any evidence tending to establish invalidity. In the end, the question is whether *all* the evidence establishes that the validity challenger so carried his burden as to have persuaded the decisionmaker that the patent can no longer be accepted as valid.

The error here, in denying Aeroquip the "benefit" of the presumption, was more rhetorical than substantive, and did not in this case rise to a level requiring reversal. The record does not indicate that Judge Boyle placed a burden of proving validity on Aeroquip. On the contrary, her full and exhaustive consideration of the prior art indicated a careful evaluation of the case made by the burden-bearing Stratoflex. We have, of course, reviewed the record here in light of the burden assigned Stratoflex by 35 U.S.C. § 282.[FN4]

> FN4. On the infringement issue, the burden is borne throughout by the patent owner (or exclusive licensee).

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***1535** (B) *Obviousness*

The declaration that claims 1, 3, 4, 6, and 7 of the '087 patent are invalid was based on a conclusion that the inventions set forth in those claims would have been obvious under 35 U.S.C. § 103, in the light of facts found in the course of following the guidelines set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693, 15 L.Ed.2d 545 (1966).

Aeroquip contends that error occurred in findings on the scope and content of the prior art, level of ordinary skill, and differences between the prior art and the claimed invention, and in the legal conclusion of obviousness based on those findings.

Judge Boyle said, "[T]he question of obviousness is a mixed question of fact and law requiring factual findings," citing the then-applicable view expressed by the Court of Appeals for the Sixth Circuit. In this court, the obviousness determination is "a legal conclusion based on factual evidence." *Stevenson v. International Trade Commission,* 612 F.2d 546, 67 CCPA 109, 204 USPQ 276 (CCPA 1979). The difference does not affect the outcome on this appeal, because it did not in this case lead to error in either the findings or conclusion.

Under Rule 52(a), Federal Rules of Civil Procedure, our review of the findings undergirding the conclusion on obviousness is limited to a determination of whether they were clearly erroneous in light of the entire record.

Scope and Content of the Prior Art

Aeroquip contends that the scope of the relevant prior art excludes rubber hose because PTFE is a unique material, possessing properties that differ significantly from rubber, and that, because the claims are limited to PTFE, the rubber hose art could at most be peripherally relevant as background information.

The scope of the prior art has been defined as that "reasonably pertinent to the particular problem with which the inventor was involved." *In re Wood,* 599 F.2d 1032, 1036, 202 USPQ 171, 174 (Cust. & Pat.App.1979), *see Weather Engineering Corp. of America v. United States,* 614 F.2d 281, 222 Ct.Cl. 322, 204 USPQ 41 (Ct.Cl.1980). The problem confronting Slade was preventing electrostatic buildup in PTFE tubing caused by hydrocarbon fuel flow while precluding leakage of fuel. None of the unique properties of PTFE would change the nature of that problem. Nor would anything of record indicate that one skilled in the art would not include the rubber hose art in his search for a solution to that problem.

Indeed, Slade himself referred to a standard textbook on conductive carbon black in rubber when he began his search for a solution. Judge Boyle correctly found Slade's act an acknowledgement by the problem solver of what he considered relevant prior art.

The examiner cited two prior art references in the rubber hose art, one disclosing the problem of electrostatic buildup caused by fuel flow. The Abbey-Upham report, though concerned with PTFE, included a conductivity comparison with carbon black filled rubber hose, and its bibliography listed several articles on electrostatic buildup in rubber. The record reflects that PTFE and rubber are used by the same hose manufacturers to make hoses and that the same and similar problems have been experienced with both. There is no basis for finding that a solution found for a problem experienced with one material would not be looked to when facing a problem with the other. The finding that the rubber hose art is relevant and thus within the scope of the art was not clearly erroneous.

The content of the prior art included the Abbey-Upham Report and several patents relating to conductive and composite rubber hose and to PTFE tubing.

The Abbey-Upham Report, as above indicated, discloses the cause of PTFE tubing "pin holes" as the

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arcing of electrostatic charges laterally through the non-conductive PTFE tubing wall to the surrounding metal braid, that carbon black increases conductivity of PTFE, and that susceptibility of PTFE tubing to "pinholing" is directly proportional to its conductivity. Judge ***1536** Boyle correctly found the report to have disclosed the basic concepts underlying the claimed invention, but not that of forming PTFE tubing as a composite having a conductive inner layer and a nonconductive outer layer.

United States Patent No. 2,341,360 ('360 patent) teaches composite tubing having carbon black in one layer to make it electrically conductive for dissipation of static electricity.

U.S. Patent No. 2,632,205 ('205 patent) teaches a rubber or plastic composite tubing for conveying fluids and having powdered metal or other conductive materials embedded along the inner wall to conduct electric charges lengthwise of the tubing.

U.S. Patent No. 3,070,132 teaches extrusion of carbon black mixed with plastic to form a continuous conductive stripe in a normally dielectric tubing to prevent accumulation of electrostatic charges. It teaches that electrostatic discharge causes leaks through the wall of the tubing and explosions when inflammable materials are conveyed. It mentions rubber tubing.

U.S. Patent No. 2,108,759 discloses an "antistatic" fuel nozzle. It teaches dissipation of electrostatic charges caused by hydrocarbon fuel flow, before those charges can arc, by employing conductive materials like synthetic rubber in an inner layer of the nozzle.

U.S. Patent No. 2,781,288 ('288 patent) teaches a composite rubber hose with each layer arranged to take advantage of its particular properties. It suggests carbon black as a filler, but not as a conductor.

U.S. Patent No. 2,645,249 ('249 patent) and U.S. Patent No. 2,501,690 ('690 patent) teach composite tubing with each layer containing different fillers to impart varying characteristics to the inner and outer layers.

U.S. Patent No. 2,863,174, U.S. Patent No. 2,685,707, and U.S. Patent No. 2,752,637 disclose the use of carbon black as an extrusion aid in forming PTFE.

U.S. Patent No. 2,945,265 ('265 patent) teaches coextrusion of PTFE with different fillers, carbon black being used as a coloring agent.

Aeroquip's attack on the content-of-the-prior-art findings is limited to its argument that rubber hose should be excluded. That argument having been found wanting, the findings on the content of the prior art cannot be viewed as clearly erroneous.

Consideration of the scope and content of the prior art tilts the scales of decision toward a conclusion of obviousness. Thus the Abbey-Upham report teaches use of carbon black to increase conductivity of PTFE tubing to reduce the chance of electrostatic buildup on the tubing wall. It would appear to have been obvious to one skilled in the art to place the conductive material in the wall where the electrostatic buildup occurs (here the inner wall subjected to electrostatic buildup by fuel flow) as suggested by the '360 and '205 patents. It would appear to have been obvious from the '288, '249, and '690 patents to form a composite tubing with layers arranged to take advantage of their physical and chemical properties. On this record, consideration of the prior art as a whole, and in the absence of evidence that any special problem in following its teachings was created by the unique properties of PTFE, it would appear to have been obvious to place a conductive PTFE layer inside an essentially non-conductive outer PTFE layer to prevent fuel seepage associated with the conductive layer.

Differences Between the Claimed Invention and the Prior Art

Though claim 7 differs substantially from the oth-

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ers, claims 1, 3, 4, 6, and 7 have not been argued separately. They therefore stand or fall together. *In re Bayer,* 568 F.2d 1357, 196 USPQ 670 (Cust. & Pat.App.1978).

Aeroquip concedes that pure PTFE had been known to be dielectric, that carbon black was known to be conductive, and that PTFE had been made into tubing containing at least a small amount of carbon black. It alleges that the prior art does not show the composite tubing set forth in the claims, ***1537** specifically a composite PTFE tubing with its inner layer formed of uniformly distributed carbon black and PTFE, to provide conductivity sufficient to dissipate electrostatic buildup, and an outer layer of relatively pure PTFE that prevents fuel leakage. It is true that no single reference shows all elements of the claims, but the holding here is one of invalidity for obviousness, not for anticipation. The question, therefore, is whether the inventions set forth in claims 1, 3, 4, 6 and 7, each as a whole, would have been obvious to one of ordinary skill in the art when they were made, in view of the teachings of the prior art as a whole.

Though findings on the "differences" from the prior art are suggested by *Graham v. John Deere,* supra, the question under 35 U.S.C. § 103 is not whether the differences *themselves* would have been obvious. Consideration of differences, like each of the findings set forth in *Graham,* is but an aid in reaching the ultimate determination of whether the claimed invention *as a whole* would have been obvious.

Judge Boyle found that the differences between the claimed invention and the prior art were use of *PTFE* in concentric tubes and the "salt and pepper" process of forming the inner layer. The first difference would indicate a mere change of material. The second difference is, of course, irrelevant as stated, the claimed inventions having nothing to do with the process of making the inner layer. The finding may have been meant to indicate that the second difference lay in the structural *result* of the "salt and pepper" process, namely a uniform dispersion of carbon black particles in the inner layer (a limitation appearing only in claim 7).

With respect to use of a different material, the problem (leakage) and the cause ("pin holes" from electrostatic charges) were known with respect to that material (PTFE). A solution for the electrostatic charge problems, i.e., dissipation of charges lengthwise of the tubing, was known. Nothing in the first difference found would indicate that it would have been nonobvious to transfer that solution from tubing formed of other materials to tubing formed of PTFE. As above indicated, no special problem needed to be or was overcome in substituting a different material (PTFE) for the materials (rubber and plastics) of the prior art.

Similarly, with respect to uniform dispersion of conductive particles, it was known that spaces between carbon black areas in tubing permit arcing. Nothing of record establishes that use of uniform dispersion to limit or eliminate such spaces would not have been obvious. The same is true respecting use of a nonconductive outer layer to contain leakage from the inner conductive layer.

Aeroquip challenges the finding that the Abbey-Upham report does not teach away from use of carbon black in PTFE tubing, citing this language in the report: "The possibility of establishing continuous longitudinal strings of carbon particles during extrusion, especially in view of the relatively small percentage of carbon black used in Teflon hose seemed remote." It appears between two others in a segment having a thrust quite opposite from that suggested by Aeroquip:

> "An explanation of this intermittent conductive behavior required some further investigation. The possibility of establishing continuous longitudinal strings of carbon particles during extrusion, especially in view of the relatively small percentage of carbon black used in Teflon hose seemed remote. If, however, the carbon particle strings were discontinuous, and the individual particles were distributed at varying distances from each

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other, the intermittent conduction observed in the carbon black filled tubes could be easily understood."

Investigators Abbey and Upham were speculating on the cause of intermittent conductivity in a PTFE tube containing carbon black. They rejected as "remote" the ***1538** possibility that in *extruding* the tubing the carbon formed continuous strings because there was a small percentage of carbon present. That sentence dealt with a process of making the tubing. As subsequently proven in the report, a better explanation was the presence of discontinuous strings in the tubing under investigation.

In the sentence following that cited to us by Aeroquip, the Abbey-Upham report describes uneven spacing between carbon black particles as a possible cause of intermittent conductivity. Far from "teaching away," therefore, the report may be viewed as pointing in the direction of uniform dispersion of such particles, as set forth in claim 7, to produce less intermittent conductivity.[FN5]

> FN5. Aeroquip's argument that simplicity will not establish obviousness is true but irrelevant. Judge Boyle did not base her obviousness conclusion on simplicity.

The findings that the differences here were use of a different material and uniform dispersion of carbon black particles were not clearly erroneous. Those differences do not tilt the scales toward a conclusion of nonobviousness of the invention as a whole in light of all prior art teachings summarized above.

Level of Ordinary Skill

The district court found the level of ordinary skill to be that of a chemical engineer or equivalent, having substantial experience in the extrusion arts. Aeroquip says that was too high, suggesting that of an engineer or technician in the PTFE art, as described by its expert, Townsend Beaman. The suggestion is but another effort to limit the prior art to PTFE tubing and avoid inclusion of the art of making fuel hoses of other materials.

The level of ordinary skill may be determined from several factors. *Orthopedic Equipment Company v. United States,* 702 F.2d 1005, 217 USPQ 193 (Fed.Cir.1983)*see Jacobson Brothers Inc. v. United States,* 512 F.2d 1065, 206 Ct.Cl. 518 (Ct.Cl.1975). Slade had the level of skill set by the district court. Stratoflex witness Linger was a mechanical engineer with years of experience in the rubber and PTFE hose art. Mr. Beaman was patent counsel for Aeroquip. Judge Boyle correctly viewed Beaman as an observer of, not a worker in, the relevant art.

The statute, 35 U.S.C. § 103, requires that a claim be declared invalid only when the invention set forth in that claim can be said to have been obvious "to one of *ordinary* skill in the art." (emphasis added) As an aid in determining obviousness, that requirement precludes consideration of whether the invention would have been obvious (as a whole and just before it was made) to the rare genius in the art, or to a judge or other layman after learning all about the invention.

Aeroquip has not shown the finding on the level of ordinary skill in the art to have been erroneous here.

Secondary Considerations

[2] It is jurisprudentially inappropriate to disregard any relevant evidence on any issue in any case, patent cases included. Thus evidence rising out of the so-called "secondary considerations" must always when present be considered en route to a determination of obviousness. *In re Sernaker,* 702 F.2d 989, 217 USPQ 1 (Fed.Cir.1983) citing *In re Fielder and Underwood,* 471 F.2d 640, 176 USPQ 300 (Cust. & Pat.App.1973), *see In re Mageli et al.,* 470 F.2d 1380, 1384, 176 USPQ 305, 307 (Cust. & Pat.App.1973) (evidence bearing on issue of nonobviousness "is never of 'no moment', is always to be considered and accorded whatever weight it may have.") Indeed, evidence of secondary considera-

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tions may often be the most probative and cogent evidence in the record. It may often establish that an invention appearing to have been obvious in light of the prior art was not. It is to be considered as part of all the evidence,***1539** not just when the decisionmaker remains in doubt after reviewing the art.

Judge Boyle made findings on secondary considerations, but said she did not include them in her analysis because she believed the claimed inventions were plainly obvious and "those matters without invention will not make patentability" and should be considered only in a close case. That was error.

Enroute to a conclusion on obviousness, a court must not stop until *all* pieces of evidence on that issue have been fully considered and each has been given its appropriate weight. Along the way, some pieces will weigh more heavily than others, but decision should be held in abeyance, and doubt maintained, until all the evidence has had its say. The relevant evidence on the obviousness-nonobviousness issue, as the Court said in *Graham,* supra, and as other courts had earlier emphasized, includes evidence on what has now been called "secondary considerations." It is error to exclude that evidence from consideration.

The error may have arisen from the circuity of the slogan oft-cited as a basis for exclusion. In the slogan as here stated: "those matters" is a synonym for "evidence of nonobviousness;" the issue is "nonobviousness" not "invention;" [FN6] and "patentability" here is a synonym for "nonobviousness." Thus the slogan reads "evidence of nonobviousness without nonobviousness will not make nonobviousness."

> FN6. See Rich, J., *Laying the Ghost of the "Invention" Requirement,* APLA Quarterly Journal, Vol. 1, No. 1, 1972, pp. 26-45.

The evidence and findings on secondary considerations being present in the record, the interests of judicial economy dictate its consideration and evaluation on this appeal. The result being unchanged, a remand for reconsideration of the evidence would in this case constitute a waste of resources for the courts and the parties.

[3] A nexus is required between the merits of the claimed invention and the evidence offered, if that evidence is to be given substantial weight enroute to conclusion on the obviousness issue. *Solder Removal Co. v. USITC,* 582 F.2d 628, 637, 65 CCPA 120, 199 USPQ 129, 137 (CCPA 1978) and cases cited therein.

Aeroquip says commercial success is shown because: the "entire industry" makes the tubing claimed in the '087 patent; only Stratoflex is not licensed under the '087 patent; Curtiss-Wright retrofitted 10,000 engines with conductive tubing; and military specifications for conductive tubing are met only by tubing claimed in the '087 patent. We are not persuaded.

Recognition and acceptance of the patent by competitors who take licenses under it to avail themselves of the merits of the invention is evidence of nonobviousness. Here, however, Aeroquip does not delineate the make-up of the "entire industry." The record reflects only two manufacturers, Titeflex and Resistoflex, in addition to the parties. Titeflex has a royalty-free license, resulting from the interference settling agreement described above. Resistoflex has a license that includes several other patents and the right to use the trademark "HI-PAC" for complete hose assemblies. Aeroquip has shown neither a nexus between the merits of the invention and the licenses of record, nor that those licenses arose out of recognition and acceptance of the patent.

No evidence of record establishes that tubing covered by the claims of the '087 patent was used in the Curtiss-Wright retrofit. It cannot therefore be given weight in respect of commercial success.

The military specifications were promulgated after the claimed invention was known. Thus the invention did not meet a longfelt but unfilled need ex-

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pressed in the specifications. Moreover, the record does not support Aeroquip's assertion that the specifications can be met only by tubing covered by the claims of the '087 patent. The nexus required to establish commercial success is therefore not present with respect to the military specifications.

***1540** Nor is there evidence that others skilled in the art tried and failed to find a solution for the problem. Aeroquip cites Abbey and Upham, but their effort was limited to investigation of the problem and its cause, and was not directed to its solution.

Upon full consideration of the evidence respecting the secondary considerations in this case, and of Aeroquip's arguments, we are persuaded that nonobviousness is not established by that evidence. Judge Boyle's error in refusing to include that evidence in her analysis was therefore in this case harmless.

"Synergism" and "Combination Patents"

Judge Boyle said "synergism" is "a symbolic reminder of what constitutes nonobviousness when a combination patent is at issue," and that under "either standard (*Graham* analysis or synergism) the combination ... simply lacks the unique essence of authentic contribution to the Teflon art which is the heart of invention."

A requirement for "synergism" or a "synergistic effect" is nowhere found in the statute, 35 U.S.C. When present, for example in a chemical case, synergism may point toward nonobviousness, but its absence has no place in evaluating the evidence on obviousness. The more objective findings suggested in *Graham,* supra, are drawn from the language of the statute and are fully adequate guides for evaluating the evidence relating to compliance with 35 U.S.C. § 103. *Bowser Inc. v. United States,* 388 F.2d 346, 181 Ct.Cl. 834, 156 USPQ 406 (Ct.Cl.1967). Judge Boyle treated synergism as an alternative consideration. Hence the error of its analytical inclusion is harmless in view of Judge Boyle's employment of the *Graham* aids.

The reference to a "combination patent" is equally without support in the statute. There is no warrant for judicial classification of patents, whether into "combination" patents and some other unnamed and undefined class or otherwise. Nor is there warrant for differing treatment or consideration of patents based on a judicially devised label. Reference to "combination" patents is, moreover, meaningless. Virtually *all* patents are "combination patents," if by that label one intends to describe patents having claims to inventions formed of a combination of elements. It is difficult to visualize, at least in the mechanical-structural arts, a "non-combination" invention, i.e., an invention consisting of a *single* element. Such inventions, if they exist, are rare indeed. Again, however, Judge Boyle's inclusion in her analysis of a reference to the '087 patent as a "combination" patent was harmless in view of her application of *Graham* guidelines.

Similarly, Judge Boyle's reference to "the heart of invention" was here a harmless fall-back to the fruitless search for an inherently amorphous concept that was rendered unnecessary by the statute, 35 U.S.C. The *Graham* analysis here applied properly looked to *patentability,* not to "invention."

[4] We sit to review judgments, not opinions. The analysis reflected in an opinion filed with the judgment appealed from may on occasion be so flawed, however, as to obfuscate the true basis for the judgment or to establish that the judgment was erroneously based. Such might have here been the case if the judgment had not been accompanied by the alternative and proper analysis under *Graham* described above. In light of that alternative analysis, in which we see no error, we affirm the judgment declaring claims 1, 3, 4, 6, and 7 invalid for obviousness.

Infringement

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When presented with patent validity and infringement issues, trial courts should, as Judge Boyle did here, decide both. First, the parties, witnesses and exhibits involved in both issues are before the court. If a judgment limited to one issue is reversed, it may become necessary to again call many of the same persons before the court for ***1541** trial or argument on the other. In any event, a remand would normally be necessary for a return by the trial court to whatever fact finding process may be involved in a determination of the undecided issue. Second, a finding that a claimed invention has or has not been appropriated by the alleged infringer may carry substantial weight in a court's analysis of *all* the evidence bearing on the obvious-nonobvious issue. An alleged infringer's lauding of all the available prior art may, for example, in some cases have a hollow ring when played against its disregard of that art and its copying of the invention.

The determination of non-infringement here was flawed by an unwarranted reading into the claims of that part of the specification devoted to a description of the "salt and pepper" process of making PTFE tubing. The "salt and pepper" process is set forth in no claim of the '087 patent. It is claimed in the separate patent described above. Whether Stratoflex employs a different process in forming its inner layer is irrelevant, the sole question being whether the accused tubing product of Stratoflex infringes the product claims of the '087 patent.

The error was harmless. Whether on proper analysis the Stratoflex "124" and "127" tubing products may be found to infringe claims 1, 3, 4, 6, and 7 need not be now determined. The claims having been found invalid, the issue has been rendered moot.

Conclusion

The judgment declaring claims 1, 3, 4, 6, and 7 invalid is affirmed.

AFFIRMED.

C.A.Fed.,1983.

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